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[54] **PERSONAL COMPUTER MICROPROCESSOR FIREWALLS FOR INTERNET DISTRIBUTED PROCESSING**

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[51] **Int. Cl.**[7] **G06F 15/173**

[52] **U.S. Cl.** **709/201**; 709/209; 713/201

[58] **Field of Search** 709/201, 200, 709/203, 208, 209, 210, 211, 100, 104, 105; 713/200, 201

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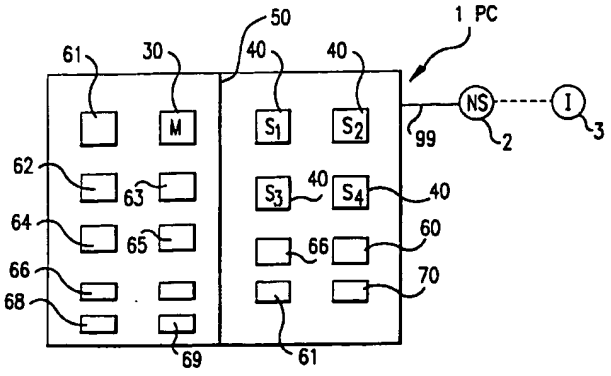
[57] **ABSTRACT**

This invention relates to computer networks having computers like personal computers (1) or network servers (2) with microprocessors linked (5) by transmission means (4, 14) and having hardware, and other means such that at least one parallel processing operation occurs that involve at least two computers in the network. This invention also relates to large networks composed of smaller networks, like the Internet (3), wherein more than one separate parallel processing operation involving more than one set of computers occurs simultaneously and wherein ongoing processing linkages can be established between microprocessors of separate computers connected to the network. This invention further relates to business arrangements enabling the shared used of network microprocessors for parallel and other processing wherein personal computer owners provide microprocessor processing power to a network, in exchange for linkage to other computers including linkage to other microprocessors; the basis of the exchange between owners and providers being whatever terms to which the parties agree.

83 Claims, 6 Drawing Sheets



able slave PC's **1** would be preferably updated on a relatively up to date basis, either when a change occurs in the idle state of a potential slave PC in the directory **121** or periodically.

Such ad hoc clusters **101** should be more effective by being less arbitrary geographically, since each individual PC would be effectively in the center of its own ad hoc cluster. Scaling up or down the number of microprocessors required by each PC at any given time would also be more seamless.

The complete interconnection potentially provided, optimally by such ad hoc wireless clusters is also remarkable because such clusters mimics the neural network structure of the animal brain, wherein each nerve cell, called a neuron, interconnects in a very complicated way with the neurons around it. By way of comparison, the global network computer described above that is expected in a decade will have at least about 10 times as many PC's as a human brain has neurons and they will be connected by electromagnetic waves traveling at close to the speed of light, which is about 300,000 times faster than the transmission speed of human neurons (which, however, will be much closer together).

An added note: in the next decade, as individual PC's become much more sophisticated and more network oriented, compatibility issues may recede to unimportance, as all major types of PC's will be able to emulate each other and most software, particularly relative to parallel processing, will no longer be hardware specific. Nearer term it will be important to set compatible hardware, software, firmware, and other component standards to achieve optimal performance by the components of the global network computer.

Until that compatibility is designed into the essential components of network system, the existing incompatibility of current components dramatically increase the difficulty involved in parallel processing across large networks. Programming languages like Java is one approach that will provide a partial means for dealing with this interim problem. In addition, using similar configurations of existing standards, like using PC's with a specific Intel Pentium chip with other identical or nearly identical components is probably the best way in the current technology to eliminate many of the serious existing problems that could easily be designed around in the future by adopting reasonable consensus standards for system components. The potential gains to all parties with an interest far outweigh the potential costs.

The above described global network computer system has an added benefit of reducing the serious and growing problem of nearly the immediate obsolescence of computer hardware, software, firmware, and other components. Since the preferred system above is the sum of its constituent parts used in parallel processing, each specific PC component becomes less critical. As long as access to the network utilizing sufficient bandwidth is possible, then all other technical inadequacies of the user's own PC will be completely compensated for by the network's access to a multitude of technically able PC's of which the user will have temporary use.

Although the global network computer will clearly cross the geographical boundaries of nations, its operation should not be unduly bounded by inconsistent or arbitrary laws within those states. There will be considerable pressure on all nations to conform to reasonable system architecture and operational standards generally agreed upon, since the penalty of not participating in the global network computer is potentially so high as to not be politically possible anywhere.

As shown in FIG. **15**, because the largest number of user PC's will be completely idle, or nearly so, during the night, it would be optimal for the most complicated large scale parallel processing, involving the largest numbers of processors with uninterrupted availability as close together as possible, to be routed by the network to geographic areas of the globe undergoing night and to keep them there even as the Earth rotates by shifting computing resources as the world turns. As shown in FIG. **15**, during the day, at least one parallel processing request by at least one PC **1** in a network **2** in the Earth's western hemisphere **131** are transmitted by very broad bandwidth connection wired **99** means such as fiber optic cable to the Earth's eastern hemisphere **132** for execution by at least one PC **1'** of a network **2'**, which is idle during the night and the results are transmitted back by the same means to network **2** and the requesting at least one PC **1**. Individual PC's within local networks like that operated by an ISP would likely be grouped into clusters or cells, as is typical in the practice of network industries. As is common in operating electrical power grids and telecommunications and computer networks, many such processing requests from many PC's and many networks could be so routed for remote processing, with the complexity of the system growing substantially over time in a natural progression.

This application encompasses all new apparatus and methods required to operate the above described network computer system or systems, including any associated computer or network hardware, software, or firmware (or other component), both apparatus and methods. Specifically included, but not limited to, are (in their present or future forms, equivalents, or successors): all enabling PC and network software and firmware operating systems, user interfaces and application programs; all enabling PC and network hardware design and system architecture, including all PC and other computers, network computers such as servers, microprocessors, nodes, gateways, bridges, routers, switches, and all other components; all enabling financial and legal transactions, arrangements and entities for network providers, PC users, and/or others, including purchase and sale of any items or services on the network or any other interactions or transactions between any such buyers and sellers; and all services by third parties, including to select, procure, set up, implement, integrate, operate and perform maintenance, for any or all parts of the foregoing for PC users, network providers, and/or others.

The forgoing embodiments meet the objectives of this invention as stated above. However, it will be clearly understood by those skilled in the art that the foregoing description has been made in terms of the preferred embodiments and that various changes and modifications may be made without departing from the scope of the present invention, which is to be defined by the appended claims.

In the claims:

1. A system architecture for computers, including personal computers, to function within a network of computers, comprising:

at least one of said computers including at least two microprocessors having a connection with said network of computers;

a firewall for said personal computers to limit access by said network to only a portion of hardware, software, firmware, and other components of said personal computers, wherein:

said firewall denies access by said network to at least a one of said microprocessors, which includes means for

functioning as a master microprocessor to initiate and control execution of a computer processing operation shared with at least one other microprocessor, including means for functioning as a slave microprocessor, and

said firewall permitting access by said network to said slave microprocessor.

2. A system for a network of computers, comprising:

at least two personal computers;

means for providing network services including shared computer processing including parallel processing, to be provided to said at least two personal computers within said network;

means for at least one of said at least two personal computers, when idled by a personal user, to be made available temporarily to provide said shared computer processing to said network;

a monitor, constructed and arranged to monitor on a net basis, a provision of said network services to each of said at least two personal computers or to said personal user;

means for maintaining a standard cost basis for a provision of said network services to each of said at least two personal computers or to said personal user;

means for at least one of said at least two personal computers, when directed by a corresponding personal user, to function temporarily as a master personal computer to initiate and control execution of a computer processing operation shared with at least one other of said at least two personal computers in said network;

means for said at least one other of said at least two personal computers, when idled by a corresponding personal user, to be made available to function temporarily as at least one slave personal computer to participate in an execution of a shared computer processing operation controlled by said master personal computer; and

means for said at least two personal computers to alternate as directed between functioning as a master and functioning as a slave in said shared computer processing operations;

at least one of said computers including at least two microprocessors and having a connection with said network of computers;

a firewall for said at least two personal computers to limit access by said network to only a portion of hardware, software, firmware, and other components of said at least two personal computers, wherein:

said firewall denying access by said network to at least one of said microprocessors, which include means for functioning as a master microprocessor to initiate and control execution of a computer processing operation shared with at least one other microprocessor, including means for functioning as a slave microprocessor, and

said firewall permitting access by said network to said slave microprocessor.

3. A system for a network of computers, comprising:

at least two personal computers;

means for at least one of said at least two personal computers, when directed by a corresponding personal user, to function temporarily as a master personal computer to initiate and control execution of a computer processing operation shared with at least one other of said at least two personal computers in said network;

means for said at least one other of said at least two personal computers, when idled by a corresponding personal user, to be made available to function temporarily as at least one slave personal computer to participate in an execution of a shared computer processing operation controlled by said master personal computer;

means for said at least two personal computers to alternate as directed between functioning as a master and functioning as a slave in said shared computer processing operations;

a firewall for said at least two personal computers to limit access by said network to only a portion of hardware, software, firmware, and other components of said at least two personal computers, wherein:

at least one of said personal computers includes at least two microprocessors and has a connection with said network of computers,

said firewall denies access by said network to at least one of said microprocessors, which includes means for functioning as a master microprocessor to initiate and control execution of a computer processing operation shared with at least one other microprocessor, including means for functioning as a slave microprocessor, and

said firewall permits access by said network to said slave microprocessor.

4. A system for a network of computers, comprising:

at least two personal computers;

at least one of said at least two personal computers, when directed by a personal user, functioning temporarily as a master personal computer to initiate and control execution of a computer processing operation shared with at least one other of said at least two personal computers in said network, said shared computer processing operation including at least one of parallel processing and multitasking processing;

at least one other of said at least two personal computers, when idled by another personal user, functioning temporarily as at least one slave personal computer to participate in the execution of said shared computer processing operation controlled by said master personal computer;

any of said at least two personal computers alternating as directed by said personal users between functioning as a master and functioning as a slave in a number of said shared computer processing operations;

a firewall, at least for said temporary slave personal computer, allowing access, at least temporarily, to a microprocessor of said temporary slave personal computer by said network during said shared computer processing operation; and

said firewall denying access by said network, during said shared computer processing operation, to a master controller mechanism of said temporary slave personal computer functioning to control said at least one microprocessor of said temporary slave personal computer when said temporary slave personal computer is not idled by said another personal user.

5. The system of claim 4, wherein said system is scalar in that a number of said personal computers participating in multiple, separate, non-related shared computer processing operations is limited only by a number of said personal computers that are connected to the network.

6. The system of claim 5, wherein at least one of said personal computers is substantially contained in a respective single microchip.

7. The system of claim 6, wherein said at least one of said personal computers substantially contained on said respective single microchip has a direct optical fiber connection with said network.

8. The system of claim 4, wherein said system is scalar in that a number of said personal computers participating as masters in multiple, separate, non-related shared computer processing operations is limited only by a number of said personal computers that are connected to the network.

9. The system of claim 4, wherein at least one of said personal computers is substantially contained in a single respective microchip having more than one microprocessor.

10. The system of claim 9, wherein said at least one personal computer substantially contained on said respective single microchip personal computers having more than one microprocessor has a direct optical fiber connection with said network.

11. The system of claim 4, wherein said network is connected to an Internet, which is utilized to provide shared computer processing services.

12. The system of claim 4, wherein said other personal computer of said at least two personal computers defaults automatically to functioning as a slave when idled by said another personal user.

13. The system of claim 4, wherein said network is connected to a World Wide Web, which is utilized to provide said shared computer processing services.

14. The system of claim 13, wherein said network includes at least one network server being configured to provide network services to said at least two personal computers that participate in shared computer processing.

15. The system of claim 4, further comprising a provider of network services, said network services including broadcast functions and shared computer processing services.

16. The system of claim 17 wherein a selection of said closest available slave personal computer is limited to one of the slave personal computers being compatible with a master personal computer in order to simplify execution of said shared computer processing operation.

17. The system of claim 4, wherein said personal computers include a transponder so that, when functioning as a master, a personal computer of said at least two personal computers can determine a closest available one of a plurality of slave personal computers.

18. The system of claim 4, wherein said at least two personal computers include at least one microprocessor and are configured to communicate with said network through a connection having a minimum speed of data transmission that is greater than a peak data processing speed of said personal computers.

19. The system of claim 4, wherein said at least two personal computers are configured to communicate with said network through a connection including a direct connection to said at least two personal computers by an optical fiber connection.

20. The system of claim 4, wherein said firewall denies access by said network during said shared processing operation to at least part of a non-volatile, writable memory of at least one of said personal computers.

21. The system architecture of claim 20, wherein said non-volatile, writable memory includes a flash bios.

22. The system of claim 4, wherein when said temporary slave personal computer is used by said another personal user, said use thereby ending the temporary slave functioning of said personal computer, said master controller mechanism of the former said temporary slave personal computer is used by said another personal user to control at least one microprocessor of a different computer in said network during a different shared computer processing operation.

23. The system of claim 22, wherein said master controller mechanism is wirelessly connected to said temporary slave personal computer.

24. The system of claim 4, wherein said master controller mechanism is located remotely from said temporary slave personal computer.

25. The system of claim 4, wherein said master controller mechanism is not a general purpose microprocessor capable of processing in said shared computer processing operation.

26. The system of claim 4, wherein at least one of said at least two personal computers is a special purpose appliance device.

27. A system architecture for computers, to function within a network of computers, said architecture comprising:

at least two personal computers, each having at least two microprocessors and a connection to a network of personal computers;

firewall means for at least some of said personal computers to limit access by said network to only a portion of at least one of hardware, software and firmware of each of said at least some of said personal computers;

each said firewall means arranged to deny access by said network to at least a first of said at least two microprocessors of said at least some of said personal computers, said first of said microprocessors arranged to function as a master microprocessor to initiate and control execution of a computer processing operation shared with at least one other microprocessor of said personal computers arranged to function as a slave microprocessor and connected to said network; and

each said firewall means arranged to permit at least temporary access by said network to at least a second of said at least two microprocessors of said at least some of said personal computers, said second of said microprocessors arranged to function as a slave microprocessor during a shared computer processing operation, said shared computer processing operation including at least one of parallel and multitasking processing.

28. The system architecture of claim 27, wherein said network is connected to a World Wide Web, which is utilized to provide shared computer processing services.

29. The system architecture of claim 28, wherein said system is scalar in that a number of said personal computers participating in multiple, separate, non-related shared computer processing operations is limited only by a number of said personal computers that are connected to the network.

30. The system architecture of claim 29, wherein at least one of said personal computers is substantially contained in a respective single microchip.

31. The system architecture of claim 30, wherein said personal computers have at least one microprocessor and are configured to communicate with said network through a connection having a minimum speed of data transmission that is greater than a peak data processing speed of said at least one personal computer.

32. The system of claim 30, wherein said at least one of said personal computers substantially contained on said respective single microchip has a direct optical fiber connection with said network.

33. The system architecture of claim 28, wherein said network is connected to an Internet, which is utilized to provide said shared computer processing services.

34. The system architecture of claim 28, wherein said system is scalar in that a number of said personal computers

participating in single shared computer processing operation is limited only by a number of said personal computers that are connected to the network.

35. The system architecture of claim 34, wherein at least one of said personal computers is substantially contained in a single respective microchip having more than one microprocessor.

36. The system of claim 35, wherein said at least one personal computer substantially contained on said respective single microchip personal computers having more than one microprocessor has a direct optical fiber connection with said network.

37. The system architecture of claim 27, wherein said firewall means denies access by said network during said shared processing operation to at least part of a non-volatile, writable memory of at least one of said personal computers.

38. The system architecture of claim 37, wherein said non-volatile, writable memory includes a flash bios.

39. The system architecture of claim 37, wherein said non-volatile, writable memory includes a hard disk.

40. The system architecture of claim 27, wherein said system further comprises control means for permitting and denying access to said personal computer by said network for shared computer processing.

41. The system architecture of claim 27, wherein said at least two personal computers are configured to communicate with said network through a connection including a direct connection to said at least two personal computers by an optical fiber connection.

42. A system architecture for computers, to function within a network of computers, said architecture comprising:

at least two personal computers, each having at least two microprocessors and a connection to a network of personal computers;

a firewall for at least some of said personal computers to limit access by said network to only a portion of at least one of hardware, software and firmware of each of said at least some of said personal computers;

each said firewall arranged to deny access by said network to at least a first of said at least two microprocessors of said at least some of said personal computers, said first of said microprocessors arranged to function as a master microprocessor to initiate and control execution of a computer processing operation shared with at least one other microprocessor of said personal computers arranged to function as a slave microprocessor and connected to said network; and

each said firewall arranged to permit at least temporary access by said network to at least a second of said at least two microprocessors of said at least some of said personal computers, said second of said microprocessors arranged to function as a slave microprocessor during a shared computer processing operation, said shared computer processing operation including at least one of parallel and multitasking processing.

43. The system architecture of claim 42, wherein said network is connected to a World Wide Web, which is utilized to provide shared computer processing services.

44. The system architecture of claim 42, wherein said firewall denies access by said network during said shared processing operation to at least part of a non-volatile, writable memory of at least one of said personal computers.

45. The system architecture of claim 42, wherein said system has a control mechanism by which to permit and to deny access to said personal computer by said network for shared computer processing.

46. The system architecture of claim 43, wherein said system is scalar in that a number of said personal computers participating in multiple, separate, non-related shared computer processing operations is limited only by a number of said personal computers that are connected to the network.

47. The system architecture of claim 46, wherein at least one of said personal computers is substantially contained in a respective single microchip.

48. The system architecture of claim 43, wherein said network is connected to an Internet, which is utilized to provide said shared computer processing services.

49. The system architecture claim 43, wherein said system is scalar in that a number of said personal computers participating in single shared computer processing operation is limited only by a number of said personal computers that are connected to the network.

50. The system architecture of claim 49, wherein at least one of said personal computers is substantially contained in a single respective microchip having more than one microprocessor.

51. The system architecture of claim 47, wherein said personal computers have at least one microprocessor and are configured to communicate with said network through a connection having a minimum speed of data transmission that is greater than a peak data processing speed of said at least one personal computer.

52. The system architecture of claim 42, wherein at least some of said personal computers include a digital signal processor.

53. The system architecture of claim 42, wherein said at least two personal computers are configured to communicate with said network through a connection including a direct connection to said at least two personal computers by an optical fiber connection.

54. The system architecture of claim 47, wherein said at least one of said personal computers substantially contained on said respective single microchip has a direct optical fiber connection with said network.

55. The system architecture of claim 50, wherein said at least one personal computer substantially contained on said respective single microchip personal computers having more than one microprocessor has a direct optical fiber connection with said network.

56. The system architecture of claim 44, wherein said non-volatile, writable memory includes a flash bios.

57. The system of claim 20, wherein said non-volatile, writable memory includes a hard disk.

58. The system architecture of claim 44, wherein said non-volatile, writable memory includes a hard disk.

59. The system architecture of claim 42, wherein at least one of said at least two personal computers is a special purpose appliance device.

60. A system for a network of computers, comprising:

at least two personal computers;

means for at least one of said at least two personal computers, when directed by a personal user, to function temporarily as a master personal computer to initiate and control execution of a computer processing operation shared with at least one other of said at least two personal computers in said network, said shared computer processing operation including at least one of parallel processing and multitasking processing;

means for at least one other of said at least two personal computers, when idled by another personal user, to function temporarily as at least one slave personal computer to participate in the execution of said shared computer processing operation controlled by said master personal computer;

means for any of said at least two personal computers to alternate as directed by said personal users between functioning as a master and functioning as a slave in a number of said shared computer processing operations;

firewall means, at least for said temporary slave personal computer, for allowing access, at least temporarily, to a microprocessor of said temporary slave personal computer by said network during said shared computer processing operation; and

said firewall means denying access by said network, during said shared computer processing operation, to a master controller mechanism of said temporary slave personal computer functioning to control said at least one microprocessor of said temporary slave personal computer when said temporary slave personal computer is not idled by said another personal user.

61. The system of claim **60**, wherein said at least two personal computers are configured to communicate with said network through a connection including a direct connection to said at least two personal computers by an optical fiber connection.

62. The system of claim **61**, wherein at least some of said personal computers include a digital signal processor.

63. The system of claim **60**, wherein said firewall means denies access by said network during said shared processing operation to at least part of a non-volatile, writable memory of at least one of said personal computers.

64. The system of claim **63**, wherein said non-volatile, writable memory includes a flash bios.

65. The system architecture of claim **63**, wherein said non-volatile, writable memory includes a hard disk.

66. The system of claim **60**, wherein said master controller mechanism is located remotely from said temporary slave personal computer.

67. The system of claim **66**, wherein said master controller mechanism is wirelessly connected to said temporary slave personal computer.

68. The system of claim **60**, wherein said system is scalar in that a number of said personal computers participating in multiple, separate, non-related shared computer processing operations is limited only by a number of said personal computers that are connected to the network.

69. The system of claim **68**, wherein at least one of said personal computers is substantially contained in a respective single microchip.

70. The system of claim **69**, wherein said at least one of said personal computers substantially contained on said respective single microchip has a direct optical fiber connection with said network.

71. The system of claim **60**, wherein at least one of said personal computers is substantially contained in a single respective microchip having more than one microprocessor.

72. The system of claim **71**, wherein said at least one personal computer substantially contained on said respective single microchip personal computers having more than one microprocessor has a direct optical fiber connection with said network.

73. The system of claim **60**, wherein said other personal computer of said at least two personal computers defaults automatically to functioning as a slave when idled by said another personal user.

74. The system of claim **60**, wherein said network is connected to a World Wide Web, which is utilized to provide said shared computer processing services.

75. The system of claim **60**, further comprising means for providing network services, said network services including broadcast functions and shared computer processing services.

76. The system of claim **74**, wherein said network includes at least one network server being configured to provide network services to said at least two personal computers that participate in shared computer processing.

77. The system of claim **60**, wherein said personal computers include a transponder so that, when functioning as a master, a personal computer of said at least two personal computers can determine a closest available one of a plurality of slave personal computers.

78. The system of claim **77**, wherein a selection of said closest available slave personal computer is limited to one of the slave personal computers being compatible with a master personal computer in order to simplify execution of said shared computer processing operation.

79. The system of claim **60**, wherein said at least two personal computers include at least one microprocessor and are configured to communicate with said network through a connection means having a minimum speed of data transmission that is at least greater than a peak data processing speed of said microprocessor personal computers.

80. The system of claim **60**, wherein said system is scalar in that a number of said personal computers participating as masters in multiple, separate, non-related shared computer processing operations is limited only by a number of said personal computers that are connected to the network.

81. The system of claim **60**, wherein said network is connected to an Internet, which is utilized to provide shared computer processing services.

82. The system of claim **60**, wherein when said temporary slave personal computer is used by said another personal user, said use thereby ending the temporary slave functioning of said personal computer, said master controller mechanism of the former temporary slave personal computer is used by said another personal user to control at least one microprocessor of a different computer in said network during a different shared computer processing operation.

83. The system of claim **60**, wherein said master controller mechanism is not a general purpose microprocessor capable of processing in said shared computer processing operation.

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